

CLAIMS

1. An automated fiber preparation apparatus for an optical fiber, comprising:  
 a transporter having an upstream end and a downstream end, the transporter being  
 constructed and arranged to automatically index a tray, which is configured to hold the  
 optical fiber, to a plurality of process stations in a direction from the upstream end  
 toward the downstream end in response to a control signal;  
 a strip tool positioned at one of the plurality of process stations between the  
 upstream end and the downstream end of the transporter, the strip tool being constructed  
 and arranged to automatically strip coating from an end portion of the optical fiber in  
 response to a control signal; and  
 a cleave tool positioned at one of the plurality of process stations between the  
 upstream end and the downstream end of the transporter, the cleave tool being  
 constructed and arranged to automatically cleave the end portion of the optical fiber in  
 response to a control signal.

15 2. The fiber preparation apparatus according to claim 1, wherein the cleave  
 tool is positioned between the strip tool and the downstream end of the transporter.

20 3. The fiber preparation apparatus according to claim 1, further comprising a  
 cleaning tool positioned at one of the plurality of process stations between the upstream  
 end and the downstream end of the transporter, the cleaning tool being constructed and  
 arranged to automatically clean the end portion of the optical fiber in response to a  
 control signal.

25 4. The fiber preparation apparatus according to claim 3, wherein the  
 cleaning tool is positioned between the strip tool and the downstream end of the  
 transporter.

30 5. The fiber preparation apparatus according to claim 1, further comprising a  
 spooling tool positioned between the upstream end and the downstream end of the  
 transporter, the spooling tool being constructed and arranged to automatically wind, in  
 response to a control signal, the optical fiber into a coiled fiber that includes at least one  
 coil of fiber with the end portion of fiber extending from the at least one coil.

6. The fiber preparation apparatus according to claim 5, wherein the spooling tool is constructed and arranged to place the coiled fiber onto the tray.

5 7. The fiber preparation apparatus according to claim 5, wherein the spooling tool is positioned between the upstream end of the transporter and the strip tool.

10 8. The fiber preparation apparatus according to claim 1, further comprising a ferrule attachment tool positioned between the upstream end and the downstream end of the transporter, the ferrule attachment tool being constructed and arranged to automatically attach a ferrule to the end portion of the optical fiber in response to a control signal.

15 9. The fiber preparation apparatus according to claim 8, wherein the ferrule attachment tool is positioned between the cleave tool and the downstream end of the transporter.

20 10. The fiber preparation apparatus according to claim 1, further comprising a load module positioned at the upstream end of the transporter, the load module being constructed and arranged to automatically load the tray onto the transporter in response to a control signal.

25 11. The fiber preparation apparatus according to claim 1, further comprising an unload module positioned at the downstream end of the transporter, the unload module being constructed and arranged to automatically unload the tray from the transporter in response to a control signal.

30 12. The fiber preparation apparatus according to claim 1, wherein the transporter is configured to index the tray in a linear direction.

13. The fiber preparation apparatus according to claim 12, wherein the transporter includes a walking beam.

14. The fiber preparation apparatus according to claim 1, further comprising a fiber placement tool that is constructed and arranged to reposition the end portion of the fiber on the tray in response to a control signal.

5 15. The fiber preparation apparatus according to claim 1, in combination with the tray.

10 16. The combination according to claim 15, wherein the tray has an outer perimeter, the tray being constructed and arranged to retain at least one end portion of the optical fiber extending outwardly beyond the outer perimeter.

17. The combination according to claim 16, wherein the tray is constructed and arranged to retain opposite ends of the optical fiber outwardly beyond the outer perimeter at opposite ends of the tray.

15 18. An automated fiber preparation apparatus for an optical fiber, comprising:  
a tray including a fiber receptacle disposed between opposing ends thereof, the fiber receptacle being constructed and arranged to contain the optical fiber therein with opposing end portions of the optical fiber extending toward the opposing ends of the tray;

20 a transporter having an upstream end and a downstream end, the transporter being constructed and arranged to automatically index the tray in a direction from the upstream end toward the downstream end in response to a control signal;

25 a fiber preparation module including at least one pair of automated fiber preparation tools positioned on opposite sides of the transporter between the upstream end and the downstream end thereof, the at least one pair of fiber preparation tools being constructed and arranged to automatically process the opposing end portions of the optical fiber in response to a control signal.

30 19. The fiber preparation apparatus according to claim 18, wherein the at least one pair of automated fiber preparation tools includes at least one of a fiber strip tool, a fiber cleaning tool, a fiber cleave tool, and a ferrule attachment tool.

20. The fiber preparation apparatus according to claim 19, further comprising a spooling tool positioned between the upstream end and the downstream end of the transporter, the spooling tool being constructed and arranged to automatically wind, in response to a control signal, the optical fiber into a coiled fiber that includes at least one 5 coil of fiber with the end portion of fiber extending from the at least one coil.

21. The fiber preparation apparatus according to claim 20, wherein the spooling tool is constructed and arranged to place the coiled fiber onto the tray.

10 22. The fiber preparation apparatus according to claim 20, wherein the spooling tool is positioned between the upstream end of the transporter and the at least one pair of automated fiber preparation tools.

15 23. The fiber preparation apparatus according to claim 18, further comprising a load module positioned at the upstream end of the transporter, the load module being constructed and arranged to automatically load the tray onto the transporter in response to a control signal.

20 24. The fiber preparation apparatus according to claim 18, further comprising an unload module positioned at the downstream end of the transporter, the unload module being constructed and arranged to automatically unload the tray from the transporter in response to a control signal.

25 25. The fiber preparation apparatus according to claim 18, wherein the tray is constructed and arranged to support the opposing end portions of the optical fiber to extend beyond the opposing ends of the tray.

30 26. The fiber preparation apparatus according to claim 25, further comprising at least one fiber placement tool that is constructed and arranged to automatically reposition at least one of the opposing end portions of the optical fiber inboard the tray in response to a control signal.

27. An automated fiber preparation apparatus for an optical fiber, comprising:  
a transporter having an upstream end and a downstream end, the transporter being  
constructed and arranged to automatically index a tray, which is configured to hold the  
optical fiber, in a direction from the upstream end toward the downstream end in  
5 response to a control signal;

10 a fiber preparation module including at least one automated fiber preparation tool  
positioned between the upstream end and the downstream end thereof, the at one fiber  
preparation tool being constructed and arranged to automatically process an end portion  
of the optical fiber in response to a control signal;

15 a load module positioned at the upstream end of the transporter, the load module  
being constructed and arranged to hold a stack of trays and to automatically load the tray  
from the stack of trays onto the transporter in response to a control signal;

20 an unload module positioned at the downstream end of the transporter, the unload  
module being constructed and arranged to hold a stack of trays and to automatically  
15 unload the tray from the transporter into the stack of trays in response to a control signal.

28. The fiber preparation apparatus according to claim 27, wherein the fiber  
preparation module includes at least one of a fiber strip tool, a fiber cleaning tool, a fiber  
cleave tool, and a ferrule attachment tool.

29. The fiber preparation apparatus according to claim 27, further comprising  
a spooling tool positioned between the upstream end and the downstream end of the  
transporter, the spooling tool being constructed and arranged to automatically wind, in  
response to a control signal, the optical fiber into a coiled fiber that includes at least one  
25 coil of fiber with the end portion of fiber extending from the at least one coil.

30. The fiber preparation apparatus according to claim 29, wherein the  
spooling tool is constructed and arranged to place the coiled fiber onto the tray.

31. The fiber preparation apparatus according to claim 30, wherein the  
spooling tool is positioned between the upstream end of the transporter and the fiber  
preparation module.

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32. A method of automatically preparing a length of optical fiber, the method comprising steps of:

- (a) providing the length of optical fiber;
- (b) automatically stripping an end portion of the optical fiber;
- (c) automatically cleaving the end portion of the optical fiber; and
- (d) automatically transporting the optical fiber from the strip tool to the cleave tool.

10 33. The method according to claim 32, wherein step (a) includes automatically placing the length of optical fiber on a tray, and step (d) includes automatically transporting the tray.

15 34. The method according to claim 33, wherein step (a) includes automatically winding the length of optical fiber into a coiled fiber.

35. The method according to claim 32, further comprising a step (e) of automatically cleaning the end portion of the optical fiber.

20 36. The method according to claim 32, further comprising a step (f) of automatically attaching a ferrule to the end portion of the optical fiber.

37. The method according to claim 32, further comprising a step (g) of automatically loading the tray onto an automated transporter.

25 38. The method according to claim 32, further comprising a step (h) of automatically unloading the tray from the automated transporter.

30 39. The method according to claim 38, wherein step (h) includes stacking the tray into a stack of trays.

40. The method according to claim 32, wherein step (d) includes intermittently transporting the optical fiber to a plurality of stations along the automated transporter.

41. The method according to claim 40, wherein step (d) includes maintaining the optical fiber at each of the plurality of process stations for a predetermined interval of time.

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42. A method of automatically preparing a length of optical fiber, the method comprising steps of:

10 downstream end of a transporter;

(a) providing the optical fiber on a tray;  
(b) automatically transporting the tray from an upstream end toward a

(c) automatically processing an end portion of the optical fiber in the tray between the upstream end and the downstream end of the transporter; and

(d) automatically unloading the tray with the optical fiber contained thereon from the downstream end of the transporter.

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43. The method according to claim 42, wherein step (a) includes automatically placing the length of optical fiber on the tray.

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44. The method according to claim 43, wherein step (a) includes automatically spooling the length of optical fiber into a coiled fiber.

45. The method according to claim 42, wherein step (c) includes automatically stripping the end portion of the optical fiber.

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46. The method according to claim 42, wherein step (c) includes automatically cleaning the end portion of the optical fiber.

47. The method according to claim 42, wherein step (c) includes automatically cleaving the end portion of the optical fiber.

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48. The method according to claim 42, wherein step (c) includes automatically attaching a ferrule to the end portion of the optical fiber.

49. The method according to claim 42, further comprising a step (e) of automatically loading the tray onto the transporter.

50. The method according to claim 42, wherein step (d) includes  
5 automatically stacking the tray into a stack of trays.

51. A method of automatically preparing a length of optical fiber, the method comprising steps of:

- (a) providing the optical fiber on a tray, which has an outer perimeter, with at least one end portion of the optical fiber extending outwardly beyond the outer perimeter of the tray in a first orientation;
- (b) automatically transporting the tray from an upstream end toward a downstream end of an automated transporter;
- (c) automatically processing the end portion of the optical fiber in the tray between the upstream end and the downstream end of the transporter; and
- (d) automatically placing the end portion of the optical fiber within the tray in a second orientation that is different from the first orientation so that the end portion is contained within the outer perimeter of the tray, subsequent to step (c).

52. The method according to claim 51, wherein step (a) includes automatically placing the length of optical fiber on the tray.

53. The method according to claim 52, wherein step (a) includes automatically spooling the length of optical fiber into a coiled fiber.

54. The method according to claim 51, wherein step (c) includes automatically stripping the end portion of the optical fiber.

55. The method according to claim 51, wherein step (c) includes automatically cleaning the end portion of the optical fiber.

56. The method according to claim 51, wherein step (c) includes automatically attaching a ferrule to the end portion of the optical fiber.

57. The method according to claim 51, further comprising a step (e) of automatically loading the tray onto the transporter.

5 58. The method according to claim 51, further comprising a step (f) of automatically unloading the tray from the transporter.

59. A method of automatically preparing a length of optical fiber, the method comprising steps of:

10 (a) providing the optical fiber on a tray with opposing end portions of the optical fiber extending from opposite ends of the tray;  
(b) automatically transporting the tray from an upstream end toward a downstream end of an automated transporter; and  
(c) automatically processing the end portions of the optical fiber  
15 simultaneously in the tray between the upstream end and the downstream end of the transporter.

60. The method according to claim 59, wherein step (a) includes automatically placing the length of optical fiber on the tray.

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61. The method according to claim 60, wherein step (a) includes automatically spooling the length of optical fiber into a coiled fiber.

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62. The method according to claim 59, wherein step (c) includes automatically stripping the end portions of the optical fiber.

63. The method according to claim 59, wherein step (c) includes automatically cleaning the end portions of the optical fiber.

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64. The method according to claim 59, wherein step (c) includes automatically attaching a ferrule to the end portions of the optical fiber.

65. The method according to claim 59, further comprising a step (d) of automatically loading the tray onto the transporter.

66. The method according to claim 60, further comprising a step (e) of  
5 automatically unloading the tray from the transporter.

67. The method according to claim 66, wherein step (e) includes automatically stacking the tray into a stack of trays.

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